

Appl. No. 10/027,343

Amendment dated September 9, 2003

Reply to Office Action of August 4, 2003

SUMMARY OF CLAIM AMENDMENTS AND COMMENTS

Claims 1, 8, 9, 10, 14, 15, 19, and 24 have been amended to reflect that the invention, as disclosed, has a hollow external manipulation shaft that internally receives a prime mover. This claimed feature leads both to structural dissimilarity to, and numerous functional improvements over, the previously cited art of Freitas et al.

Claims 2, 3, 4, 8, 9, 10, 14, 15, 20, 21, 25, and 26 have been amended to reflect that the invention, as disclosed, possesses a coupler and anchor that are capable of transferring rotational force applied to the tool. This claimed feature leads to both structural dissimilarity to, and numerous functional improvements over, the previously cited art of Freitas et al.

Claims 4, 8, 9, 11, 12, 15, 16, 17, 18, 19, 20, 21, and 24 have been amended to reflect the differences in the frangible portion of the anchor-coupling system over the prior art of Chien. The instant invention now claims an apparatus that cannot easily be inadvertently or intentionally re-used, unlike Chien et al. The frangible portion of the instrument, as now claimed, is located in a low stress configuration that is unlikely to affect the working strength of the tool.

Claims 5, 22, and 27 have been amended to reflect the difference in the axis of frangibility of the instant invention, relative to the prior art.

Claims 6, 23, and 28 have been amended to reflect the containment of potential broken pieces within the apparatus, caused by release of the frangible portion, in contrast to the Chien device.

Claims 29-42 have been amended to reflect means for internally receiving a means for transmitting motion, including rotational motion; means for providing both releasable and non-releasable mating means of various components; and means for frangible portion orientation.

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AMENDMENTS TO THE CLAIMS

Amendments to the claims

1. (currently amended): A reconfigurable surgical apparatus, comprising:

a surgical instrument assembly formed with a hollow manipulation shaft internally receiving a prime mover activated by an actuator located at a proximal end of the shaft;

a coupler formed about a distal end of the shaft and having a capture ledge; and

an interchangeable surgical tool attachable to the coupler and including an anchor adapted to ~~releasably~~-mate to the capture ledge.
2. (currently amended): The apparatus according to claim 1, wherein the capture ledge is further formed in the coupler to define at least one lateral slot adapted to ~~releasably~~-receive the anchor and capable of transferring rotational force from the prime mover to the tool.
3. (currently amended): The apparatus according to claim 2, wherein the anchor is formed as a generally hook shaped tine having an end sized for ~~releasable~~-receipt into the slot- and capable of transferring rotational force from the prime mover to the tool.
4. (currently amended): The apparatus according to claim 1, wherein the anchor is formed with at least one generally hook shaped tine, formed with a frangible portion, that includes an engagement face adapted to ~~non-releasably~~~~releasably~~ engage the capture ledge- and the tine to capture ledge engagement is capable of transferring rotational force from the prime mover to the tool.

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5. (currently amended): The apparatus according to claim 1, wherein the anchor is formed with a frangible portion designed to break in an orientation substantially orthogonal to a direction of translation of the prime mover.

6. (currently amended): The apparatus according to claim ~~45~~, wherein the frangible portion is ~~further formed to define at least one shear notch~~ substantially sealed from an exterior environment by the coupler and the manipulation shaft.

7. (original): The apparatus according to claim 2, wherein the anchor is formed with a frangible portion adapted to be removably received in the slot after the frangible portion of the anchor has been severed.

8. (currently amended): A reconfigurable surgical apparatus, comprising:
a surgical instrument assembly formed with a hollow manipulation shaft internally receiving a prime mover activated by an actuator located at a proximal end of the shaft;
a coupler formed about a distal end of the shaft having a capture ledge that defines a slot in the coupler; and
an interchangeable surgical tool adapted to connect to the coupler comprising a frangible portion and an anchor adapted to ~~non-releasably~~releasably mate to the capture ledge and capable of transferring rotational force from the prime mover to the tool, the frangible portion being adapted for receipt in the slot after the anchor has been removed from the tool.

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9. (currently amended): A reconfigurable surgical apparatus, comprising:

a surgical instrument assembly formed with a hollow manipulation shaft internally receiving a prime mover activated by an actuator located at a proximal end of the shaft;

a coupler formed about a distal end of the shaft having a capture ledge that defines a lateral slot in the coupler; and

an interchangeable surgical tool for attachment to the coupler and formed with an anchor having a shear notch, the anchor being adapted to ~~non-releasably~~releasably mate to the capture ledge and capable of transferring rotational force from the prime mover to the tool, and to be severed from the tool about the notch.

10. (currently amended): A reconfigurable surgical apparatus, comprising:

a surgical instrument assembly formed with a hollow manipulation shaft internally receiving a prime mover activated by an actuator located at a proximal end of the shaft;

a coupler formed about a distal end of the shaft and incorporating an anchor; and

an interchangeable surgical tool adapted to connect to the coupler and formed with a capture ledge adapted to ~~releasably~~releasably mate to the anchor and capable of transferring rotational force from the prime mover to the tool.

11. (currently amended): The apparatus according to claim 10, wherein the capture ledge is further formed in the tool to define at least one lateral slot adapted to ~~non-releasably~~releasably receive the anchor.

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12. (currently amended): The apparatus according to claim 11, wherein the anchor is formed as a generally hook shaped tine having an end sized for ~~non-releasable~~releasable receipt into the slot.

13. (currently amended): The apparatus according to claim 10, wherein the anchor is formed with at least one generally hook shaped tine that includes an engagement face adapted to non-releasably ~~releasably~~ engage the capture ledge.

14. (currently amended): A reconfigurable surgical apparatus, comprising:
a surgical instrument assembly formed with a hollow manipulation shaft internally receiving a prime mover activated by an actuator located at a proximal end of the shaft;
a coupler formed about a distal end of the shaft to have a generally hook shaped anchor having an engagement face; and
an interchangeable surgical tool formed at an end with a capture ledge that defines a lateral slot in the tool, the ledge being adapted to ~~releasably-mate~~ to the engagement face and capable of transferring rotational force from the prime mover to the tool.

15. (currently amended): A reconfigurable surgical apparatus, comprising:
a surgical instrument assembly formed with a hollow manipulation shaft internally receiving a prime mover activated by an actuator located at a proximal end of the shaft;
a coupler formed about a distal end of the shaft and formed with an anchor, and

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an interchangeable surgical tool configured to connect to the coupler and formed with a reciprocating capture member adapted to ~~non-releasably~~releasably mate to the anchor and capable of transferring rotational force from the prime mover to the tool.

16. (currently amended): The apparatus according to claim 15, wherein the capture member is further formed in the tool to define at least one lateral recess adapted to ~~releasably~~ receive the anchor.

17. (currently amended): The apparatus according to claim 16, wherein the anchor is formed as a generally hook shaped tine having an end sized for ~~releasable~~ receipt into the recess.

18. (currently amended): The apparatus according to claim 15, wherein the anchor is formed with at least one generally hook shaped tine that includes an engagement face adapted to ~~releasably~~ engage the capture ledge.

19. (currently amended): A reconfigurable surgical tool, comprising:
a surgical instrument assembly formed with a hollow manipulation shaft internally receiving a prime mover activated by an actuator located at a proximal end of the shaft;
a coupler formed about a distal end of the shaft and including a receiver having an engagement ledge and shelf; and
an interchangeable surgical tool attachable to the coupler that includes an engager adapted to ~~releasably~~ mate to the receiver.

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20. (currently amended): The apparatus according to claim 19, wherein the receiver further defines a generally hook shaped recess adapted to ~~releasably-mate~~ to the engager and capable of transferring rotational force from the prime mover to the tool.
21. (currently amended): The apparatus according to claim 19, wherein the engager is further formed with a generally hook shaped projection adapted to ~~releasably-mate~~ to the receiver and capable of transferring rotational force from the prime mover to the tool.
22. (currently amended): The apparatus according to claim 19, wherein the engager is formed with a frangible portion designed to break in an orientation substantially orthogonal to the direction of translation of the prime mover.
23. (currently amended): The apparatus according to claim 22, wherein the frangible portion is ~~further formed to define at least one shear notch~~ sealed from an exterior environment by the coupler and the manipulation shaft.
24. (currently amended): A reconfigurable surgical tool, comprising:
a surgical instrument assembly formed with a hollow manipulation shaft internally receiving a prime mover activated by an actuator located at a proximal end of the shaft;
a coupler formed about a distal end of the shaft and formed with an engager; and
an interchangeable surgical tool formed with a receiver formed with an engagement ledge and shelf and adapted to ~~releasably-mate~~ to the engager.

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25. (currently amended): The apparatus according to claim 24, wherein the receiver is further formed to define a generally hook shaped recess sized to non-releasably receive the engager and capable of transferring rotational force from the prime mover to the tool.

26. (currently amended): The apparatus according to claim 24, wherein the engager further incorporates a generally hook shaped projection adapted for non-releasable receipt in the recess to releasably mate to the receiver and capable of transferring rotational force from the prime mover to the tool.

27. (currently amended): The apparatus according to claim 24, wherein the engager is formed with a frangible portion designed to break in an orientation substantially orthogonal to the direction of translation of the prime mover.

28. (currently amended): The apparatus according to claim 27, wherein the frangible portion is ~~further formed to define at least one shear notch~~ sealed from an exterior environment by the coupler and the manipulation shaft.

29. (currently amended): A means for performing an intracorporeal surgical procedure, comprising:

a means for imparting a range of motion;

a means for defining an intracorporeal passageway connected at a proximal end to the motion imparting means, the passageway being internally received with a means for transmitting the imparted range of motion;

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a means for distally coupling the passageway means that defines a means for interchangeably capturing;

an interchangeable means for performing a surgical intervention that includes a means for ~~releasably~~ mating the intervention means to the capturing means; and

wherein the interchangeable intervention means is, when mated to the capturing means, remotely actuatable by operation of the motion imparting means.

30. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 29, wherein the capturing means is further formed in the coupling means to define at least means for defining a lateral slot adapted to ~~releasably~~ receive the mating means and capable of transmitting rotational force between the motion imparting means and the interchangeable intervention means.

31. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 30, wherein the mating means is formed as a generally hook shaped tine having an end sized for ~~releasable~~ receipt into the slot and capable of transmitting rotational force between the motion imparting means and the interchangeable intervention means.

32. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 29, wherein the mating means is formed with at least one generally hook shaped tine that includes an engagement face adapted to ~~releasably~~ engage the means for

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capturing and the mating means is capable of transmitting rotational force between the motion imparting means and the interchangeable intervention means.

33. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 29, wherein the means for mating is further formed with a means for defining a frangible portion of the mating means designed to break in an orientation substantially orthogonal to a direction of translation of the motion imparting means.

34. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 33, wherein the frangible portion defining means is further formed with a means to define a reduced cross section of the mating means and the frangible portion defining means is substantially sealed from an exterior environment by the passageway means and the coupling means.

35. (original): The means for performing an intracorporeal surgical procedure according to claim 30, wherein the mating means is formed with a frangible portion defining means adapted to be removably received in the slot after the frangible portion defining means has been severed.

36. (currently amended): A means for performing an intracorporeal surgical procedure, comprising:

a means for imparting a range of motion;

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a means for defining an intracorporeal passageway connected at a proximal end to the motion imparting means, the passageway being internally received with a means for transmitting the imparted range of motion;

a means for distally coupling the passageway means that defines a means for anchoring;

an interchangeable means for performing a surgical intervention that includes a means for ~~releasably~~ capturing the anchoring means; and

wherein the interchangeable intervention means is, when mated to the anchoring means, remotely actuatable by operation of the motion imparting means and capable of transmitting rotational force between the motion imparting means and the interchangeable intervention means.

37. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 36, wherein the capturing means is further formed in the intervention means to define at least one means for defining a lateral slot adapted to non-releasably receive the anchoring means.

38. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 37, wherein the anchoring means is formed as a generally hook shaped tine having an end sized for non-releasable receipt into the slot.

39. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 36, wherein the anchoring means is formed with at least one generally hook shaped tine that includes an engagement face adapted to non-releasably engage the means for

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capturing.

40. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 36, wherein the means for anchoring is further formed with a means for defining a frangible portion of the anchoring means designed to break in an orientation substantially orthogonal to a direction of translation of the motion imparting means.

41. (currently amended): The means for performing an intracorporeal surgical procedure according to claim 40, wherein the frangible portion defining means is further formed with a means to define a reduced cross section of the anchoring means and the frangible portion defining means is substantially sealed from an exterior environment by the passageway means and the coupling means.

42. (original): The means for performing an intracorporeal surgical procedure according to claim 37, wherein the anchoring means is formed with a frangible portion defining means adapted to be removably received in the slot after the frangible portion defining means has been severed.